SPYWOLF

Security Audit Report

Completed on

October 18, 2023

OVERVIEW

This audit has been prepared for **Carol Protocol** to review the main aspects of the project to help investors make make an informative decision during their research process.

You will find a a summarized review of the following key points:

- ✔ Contract's source code
- ✔ Owners' wallets
- ✔ Tokenomics
- ✔ Team transparency and goals
- ✔ Website's age, code, security and UX
- ✔ Whitepaper and roadmap
- ✔ Social media & online presence

The results of this audit are purely based on the team's evaluation and does not guarantee nor reflect the projects outcome and goal

- SPYWOLF Team -

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Carol Protocol

PROJECT DESCRIPTION

According to their documentation:

CAROL is utilized in bonding mechanisms, allowing participants to lock their funds for a specific period in exchange for potential earnings and participation in protocol governance.

The CAROL token serves as a key component in liquidity pools, facilitating exchanges and creating sustainable market conditions for all participants. It serves as a central element within the network, providing unique opportunities for participation in bonding and liquidity provision.

Release Date: Launched Q3, 2023

Category: Liquid Staking/Yield

CONTRACT 1 INFO (Main Contract)

Token Name	Symbol
N/A	N/A

Contract Address
0x26fe408BbD7A490fEB056DA8e2D1e007938E5685

Network	Language
Base	Solidity

Deployment Date	Verified?
Sep 07, 2023	Yes

Total Supply	Status
N/A	Launched

TAXES

Buy Tax
Up to 30%

Sell Tax
none

Our Contract Review Process

The contract review process pays special attention to the following:

- Testing the smart contracts against both common and uncommon vulnerabilities
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

Blockchain security tools used:

- OpenZeppelin
- Mythril
- Solidity Compiler
- Hardhat

TOKEN TRANSFERS STATS

Transfer Count	N/A
Uniq Senders	N/A
Uniq Receivers	N/A
Total Amount	N/A
Median Transfer Amount	N/A
Average Transfer Amount	N/A
First transfer date	N/A
Last transfer date	N/A
Days token transferred	N/A

SMART CONTRACT STATS

Calls Count	N/A
External calls	N/A
Internal calls	N/A
Transactions count	N/A
Uniq Callers	N/A
Days contract called	N/A
Last transaction time	Oct-17-2023 12:28:13 PM +UTC
Created	Sep-07-2023 01:32:03 PM +UTC
Create TX	0x85a31ad4307807566f61e4c5b4fb05201de4ab8e706441d5c4fe9a824d6bf848
Creator	0xf993ac8c118e3cc16a8c37accfdd442b2fd66666

VULNERABILITY CHECK

Design Logic	Passed
Compiler warnings.	Passed
Private user data leaks	Passed
Timestamp dependence	Passed
Integer overflow and underflow	Passed
Race conditions and reentrancy. Cross-function race conditions	Passed
Possible delays in data delivery	Passed
Oracle calls	Passed
Front running	Passed
DoS with Revert	Passed
DoS with block gas limit	Passed
Methods execution permissions	Passed
Economy model	Passed
Impact of the exchange rate on the logic	Passed
Malicious Event log	Passed
Scoping and declarations	Passed
Uninitialized storage pointers	Passed
Arithmetic accuracy	Passed
Cross-function race conditions	Passed
Safe Zeppelin module	Passed
Fallback function security	Passed

THREAT LEVELS

When performing smart contract audits, our specialists look for known vulnerabilities as well as logical and access control issues within the code. The exploitation of these issues by malicious actors may cause serious financial damage to projects that failed to get an audit in time. We categorize these vulnerabilities by the following levels:

High Risk

Issues on this level are critical to the smart contract's performance/functionality and should be fixed before moving to a live environment.

Medium Risk

Issues on this level are critical to the smart contract's performance/functionality and should be fixed before moving to a live environment.

Low Risk

Issues on this level are minor details and warning that can remain unfixed.

Informational

Information level is to offer suggestions for improvement of efficacy or security for features with a risk free factor.

FOUND THREATS

⚠ Medium Risk

Owner can issue new bonds for free.
New bonds can be issued only when the contract's token balances are equal or higher than the new bond's issue token amount.

```
function influencerBond(address userAddr, uint256 tokensAmount) external onlyOwner {
    require(users[userAddr].bondsNumber < Constants.BONDS_LIMIT, "User have reached bonds limit");
    require(IERC20(TOKEN_ADDRESS).balanceOf(address(this)) >= tokensAmount, "Insufficient token balance");

    users[userAddr].balance+= tokensAmount * 5 / 100;
    uint256 ethAmount = getETHAmount(tokensAmount * 95 / 100);
    uint8 bondIdx = newBond(userAddr, 4, ethAmount, 0);

    CAROLToken(TOKEN_ADDRESS).burn(tokensAmount);

    emit Events.NewBond(
      userAddr, 4, bondIdx, ethAmount, tokensAmount * 95 / 100, false, block.timestamp
    );
}
```

- Recommendation:
  - No one should be able to issue new bonds for free.

Informational

Owner can activate/deactivate bond types (1, 2 and 3), which are for 20 days, 10 days and 5 days periods respectively.
Bonds 0 and 4 (30 days and 100 days) cannot be influenced by owner
Every bond type have different ROI and freeze periods.

```
function activateBondType(uint8 bondType) external onlyOwner {
    require(bondType > 0 && bondType < 4, "Invalid bond type");
    BOND_ACTIVATIONS[bondType] = true;
  }

function deactivateBondType(uint8 bondType) external onlyOwner {
    require(bondType > 0 && bondType < 4, "Invalid bond type");
    BOND_ACTIVATIONS[bondType] = false;
}

  uint256[5] public BOND_FREEZE_PERIODS = [
     30 days,
     20 days,
     10 days,
      5 days,
    100 days
];
uint256[5] public BOND_FREEZE_PERCENTS = [
  3000,
  2000,
  1000,
   500,
     0
];
bool[5] public BOND_ACTIVATIONS = [
  true,
  false,
  false,
  false,
  false
];
```

Informational

When users set address they buy with for referral or address(0) or address that is not participating in the project yet (address with 0 bonds), the user becomes referral to default address assigned by project owner.
Referral rewards can go from 5% up to 20% from user's deposited value based on how many total funds users collected from previous referrals.

```
function buy(address upline, uint8 bondType) external payable {
.............................
bool isNewUser = false;
Models.User storage user = users[msg.sender];
if (user.upline == address(0)) {
  isNewUser = true;
  if (upline == address(0) || upline == msg.sender || users[upline].bondsNumber == 0) {
    upline = DEFAULT_UPLINE;
  }
  user.upline = upline;

  if (upline != DEFAULT_UPLINE) {
    users[upline].referrals.push(msg.sender);
  }

  emit Events.NewUser(
    msg.sender, upline, block.timestamp
  );
}
.............................
}
```

Informational

There is 10% fee for bonds buy/staking that goes to the project's owner. There is additional tax from 5% up to 20% (depending on users referrals and how much new capital they bring into the ecosystem) which goes towards referrals rewards.

```
uint256[] public REFERRAL_LEVELS_PERCENTS = [500, 700, 900, 1100, 1400, 1600, 1800, 2000];
uint256[] public REFERRAL_LEVELS_MILESTONES = [0, 5 ether, 15 ether, 50 ether,
100 ether, 250 ether, 750 ether, 1500 ether];

function buy(address upline, uint8 bondType) external payable {
.......................
    uint256 refReward = distributeRefPayout(user, msg.value, isNewUser);
    uint256 adminFee = msg.value / 10;
    payable(owner()).transfer(adminFee);
.......................
}

function stake(uint8 bondIdx) external payable {
.......................
uint256 refReward = distributeRefPayout(user, msg.value, false);
uint256 adminFee = msg.value / 10;
payable(owner()).transfer(adminFee);
uint256 tokensAmount = getTokensAmount(ethAmount);
ethAmount = msg.value - refReward - adminFee;
.......................
}
```

RECOMMENDATIONS FOR

GOOD PRACTICES

1. Consider fundamental tradeoffs
2. Be attentive to blockchain properties
3. Ensure careful rollouts
4. Keep contracts simple
5. Stay up to date and track development

Carol

GOOD PRACTICES FOUND

- ✔ The owner cannot set a transaction limit

CONTRACT 2 INFO (Token)

Token Name CAROL	Symbol CAROL
Contract Address 0x4A0a76645941d8C7ba059940B3446228F0DB8972	
Network Base	Language Solidity
Deployment Date Sep 07, 2023	Verified? Yes
Total Supply 10,350,233	Status Launched

TAXES

Buy Tax	Sell Tax
N/A	N/A

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Blockchain security tools used:

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- Mythril
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Informational

Owner can enable/disable token buys.

```
function unlockBuy() external onlyOwner {
    buyLocked = false;
}

function lockBuy() external onlyOwner {
    buyLocked = true;
}

function _beforeTokenTransfer(address from, address to, uint256 ) internal view override {
    if (LP_TOKEN_ADDRESS == address(0) || !buyLocked) {
      return;
    }

    if (from == LP_TOKEN_ADDRESS || from == UNISWAP_ROUTER_ADDRESS) {
      require(
          to == mainContractAddress
        || to == UNISWAP_ROUTER_ADDRESS
        || to == LP_TOKEN_ADDRESS
        || to == address(0),
        "Transfer: only main contract can buy tokens"
      );
    }
}
```

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Carol

GOOD PRACTICES FOUND

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This is *ROI staking dapp with referral system that allows users to get up to 20% from each referral. When users choose to stake their capital (bonds/liquidity) they can earn up to 150% of their initial investment over time.

More information can be found in the project's documents page:
https://carol-8.gitbook.io/documentation/description-of-the-carol-token/bonding-and-liquidity-provision-mechanisms

ROI dapps are considered as high risk and can cause significant losses of capital.
***DYOR before investing in any.**

ROI - **Return **O**f **I**nvestment*
DYOR - **Do **Y**our **O**wn **R**esearch*

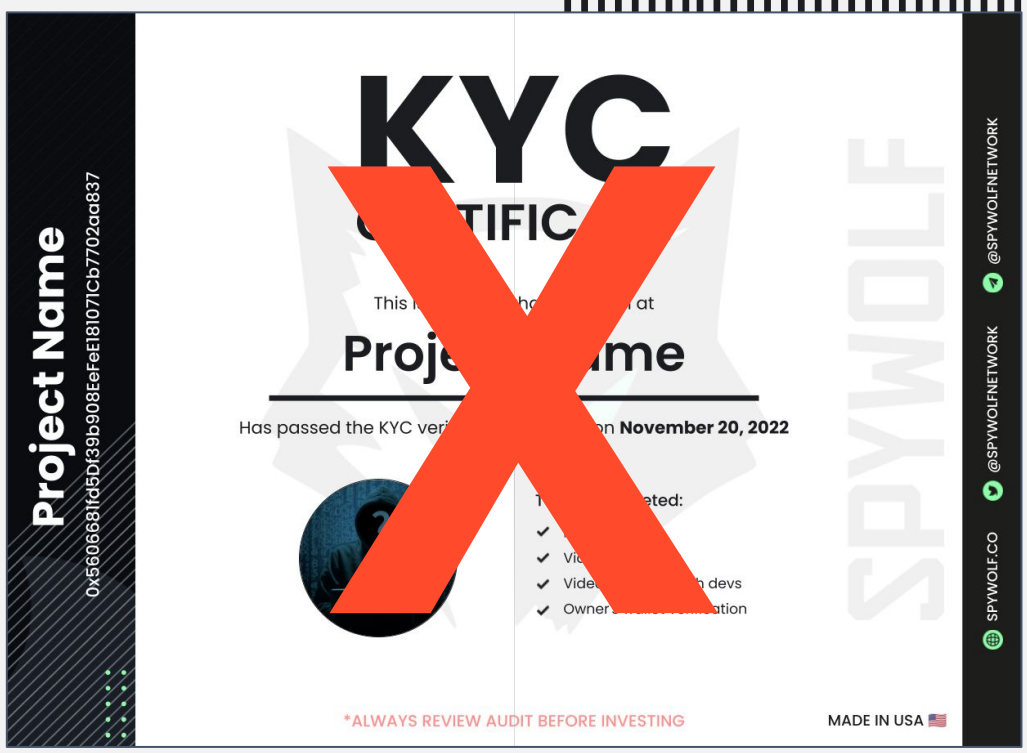
THE TEAM

⚠️ The team is annonymous

KYC INFORMATION

No KYC

We recommend the team to get a KYC in order to ensure trust and transparency within the community.



WEBSITE

Website URL
https://carol.finance/

Domain Registry
https://www.namecheap.com/

Domain Expiration
2024-08-04

Technical SEO Test
Passed

Security Test
Passed. SSL certificate present

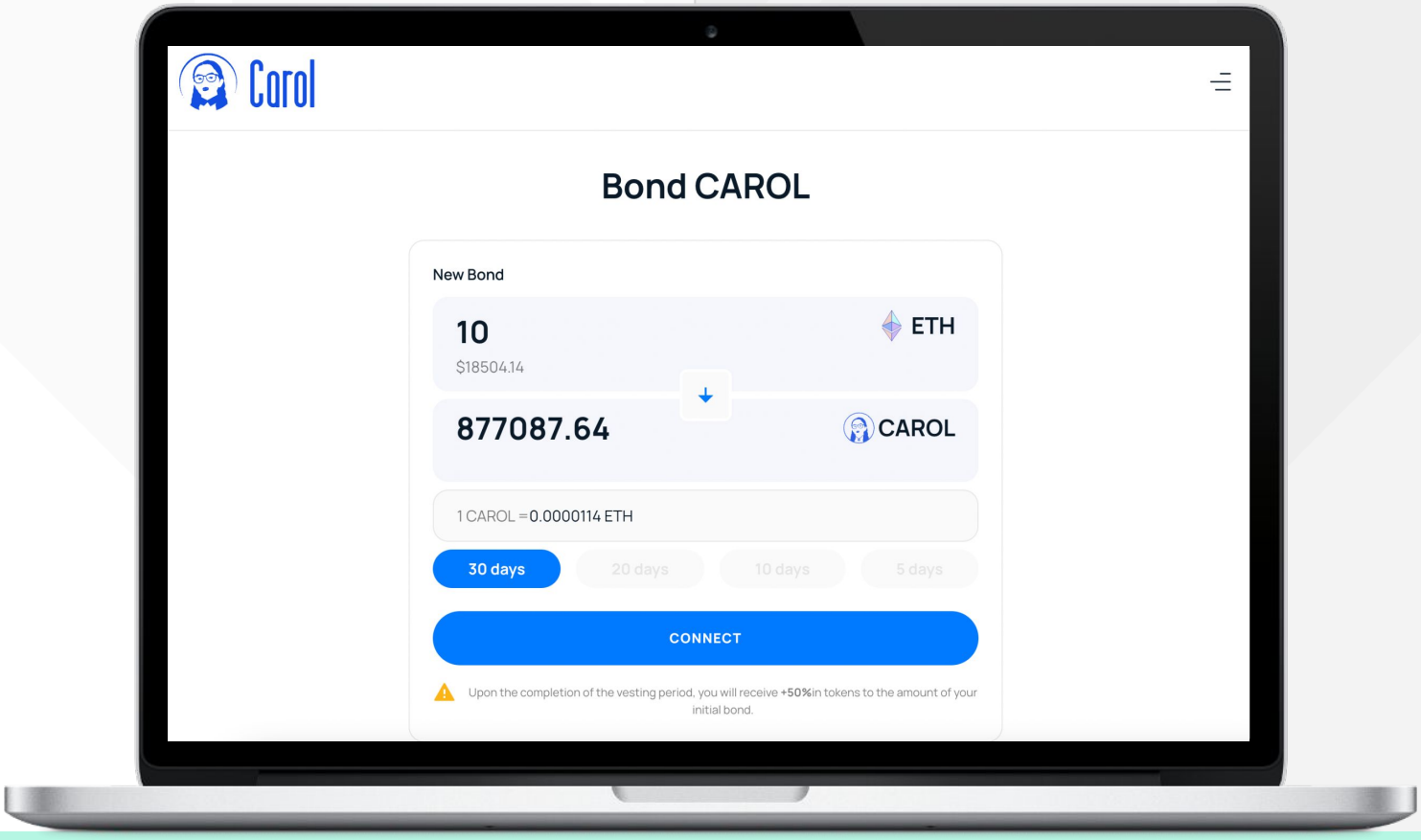
Design
Very nice appearance with appropriate color scheme and graphics.

Content
The information helps new investors understand what the product does right away. No grammar mistakes found.

Whitepaper
Well written, explanatory.

Roadmap
Yes

Mobile-friendly?
Yes



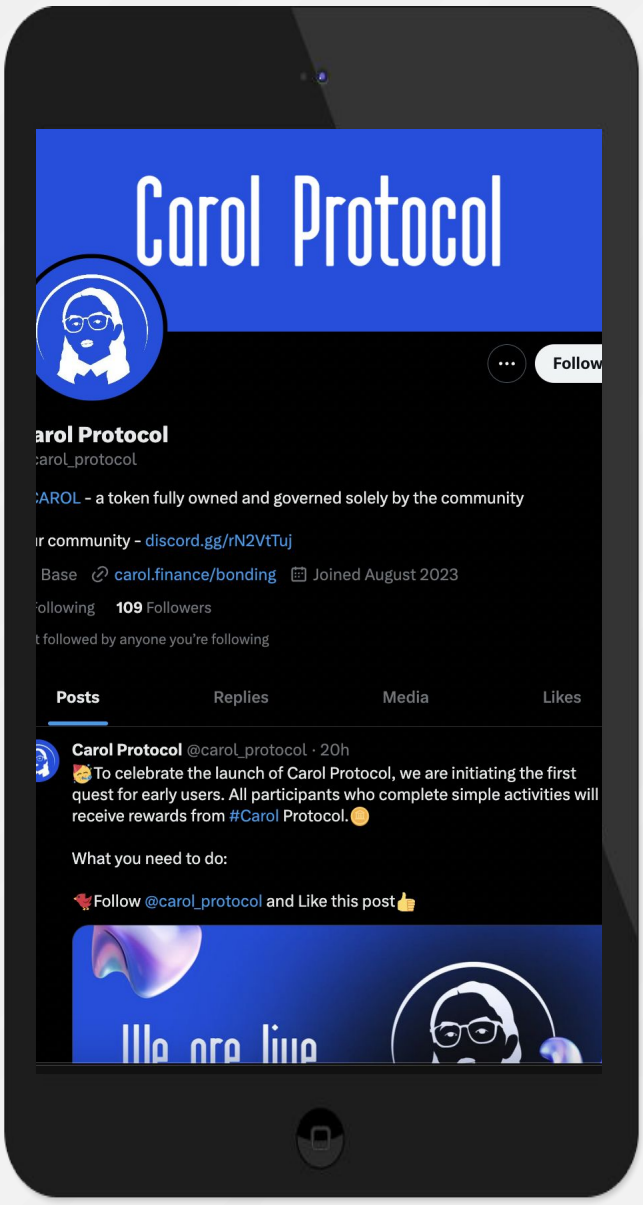
carol.finance

SOCIAL MEDIA

& ONLINE PRESENCE

ANALYSIS

Project's social media pages are active..



Twitter

@carol_protocol

- 511 followers
- Posts frequently
- Active

Discord

invite/XYddwyDhXq

- 157 members
- Active

Telegram

@CAROL_protocol_group

- 5 565 members
- Active members
- Active mods

Medium

- Not available

SPYWOLF

CRYPTO SECURITY

ABOUT US

We are a growing crypto security agency offering audits, KYCs and consulting services for some of the top names in the crypto industry.

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Disclaimer

This report shows findings based on our limited project analysis, following good industry practice from the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, overall social media and website presence and team transparency details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report.
While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the disclaimer below – please make sure to read it in full.

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No applications were reviewed for security. No product code has been reviewed.